

## Thomas Finseth

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**From:** Frank, Stephen [Stephen.Frank@nrgenergy.com]  
**Sent:** Friday, May 16, 2014 3:50 PM  
**To:** 'Jordan, Ronald'  
**Cc:** Jacklin, Mark J; Thomas Finseth; Flanders, Phillip; Schroeder, Cuc; Yan Zhuang  
**Subject:** RE: Effluent data for Keystone Generating Station  
**Attachments:** 1.27.14 G1401B90.pdf; 2.3.14 G1402038.pdf; 2.10.14 G1402340.pdf; 2.17.14 G1402614.pdf; 2.24.14 G1402921.pdf; 3.4.14 G1403113.pdf; 3.10.14 G1403388.pdf; 3.10.14 G1403389.pdf; 3.17.14 G1403823.pdf; 3.24.14 G1403C32.pdf; 3.31.14 G1403F81.pdf; 4.7.14 G1404452.pdf; 4.14.14 G1404910.pdf; 4.21.14 G1404D11.pdf; 4.28.14 G1404H01.pdf; Analytical Data Table.xlsx; Aug 2013 Trends.pdf; February 21 2013 Sample Report.pdf; FGD Influent 4.10.12.pdf; July 2012 Trends.pdf; 1.6.14 G1401169.pdf; 1.13.14 G1401482.pdf; 1.20.14 G1401865.pdf

Ron,

Attached and below are answers (in red) to your follow-up questions. Please do not hesitate to contact me with any questions.

Thanks, Steve

1. EPA requests NRG Energy to provide the available influent and effluent data for samples analyzed using EPA Method 200.8, as mentioned in your February 21 email and discussed on May 1<sup>st</sup>. We understand that such data includes results for arsenic, selenium and other trace metals.
  - a. In addition, please provide the laboratory reports for these data and confirm whether the laboratory was using a collision cell or dynamic reaction cell as part of the analysis (and if that was so, please confirm which type was used). **Arsenic and nickel are run in collision mode, and selenium and chromium are run in reaction mode.** We do not need you to obtain "J-value" information from the laboratory for these samples. **Also, based on discussions with our laboratory, Geochemical Testing, the primary reason for the dilution of samples for analysis is due to the interference caused by the formation of crystals (I assume gypsum) in the undiluted sample.**
2. Please provide the laboratory report associated with the 2/21/13 arsenic analysis using Method 6020. **(Attached)**
3. Please provide the laboratory report for the 4/10/12 analysis showing 1,390 ug/L arsenic in the FGD influent. **(Attached)**
4. Please review process/operational data for July 2012 and August 2013 to evaluate whether there were any unusual process changes that may be linked to the arsenic results for 7/24/12 and 8/12/13.

**Based on our review of influent and effluent there were no trends (see attached) to suggest any process upset occurred during July of 2012. We did not see any WWT operational issues in July 2012. The clarifier bed level and turbidity levels were good, polishing filter turbidities were good, B gravity filter ATP reading was just a bit higher than normal but no biocide treatments were needed. Influent arsenic and selenium were somewhat elevated but nothing too far out of line. TSS was less than 1 mg/l.**

**For the August 2013 arsenic result, there was a swing from high to low week after week in many of the influent concentrations (see attached trends). Based on our review of operational data, the most likely cause may be associated with the return of absorber slurry from our "Drain Tank" from July 19 to August 1st. We suspect that the slurry in the Drain Tank was place there during an earlier outage for Unit 1. The influent BOD(5 day) concentrations (while low) slowly increased with each Drain Tank addition. However, this swing in concentrations did not hold in the effluent sample results, and TSS effluent concentrations were low.**

Therefore, the elevated 8/12/13 sample result may be associated with chemical reactions caused by the biological growth in the drain tank/absorber and/or the biological growth in the gravity filters and reduced performance in the FGD WWT System. Records indicate that a non-oxidizing biocide was fed to FGD WWT gravity filters on 8/6, 8/9, 8/16, and 8/29. This is an unusually high frequency of biocide doses. ATP readings from FGD WWT on 7/31 were very low. The low concentrations of TSS in the effluent seems to point this to chemical reactions caused by the biological growth in the drain tank/absorber.

Please note that we do not have conclusive data on the following statements. NRG has observed slight increases in dissolved arsenic and selenium at Keystone and other generating stations following station outages. The severity appears to follow the length of time the absorber slurry is in storage, which leads to increasing levels of biological activity. The increase in biological activity may cause a drop in ORP as the slurry sits causing arsenic to form a more soluble and difficult to remove species. Selenium appears to shift to an unstable insoluble species. Dissolved arsenic may slowly revert back to a less soluble species upon return to the absorber tower with the increase in ORP. Conversely, insoluble selenium appears to immediately desorb from the insoluble phase to the dissolved phase causing a short term spike in selenium concentrations entering the FGD WWTPs. We have developed and are refining methods to control the impacts associated with this biological growth.

5. Please review process/operational data (including TSS data) for October 2012 to evaluate whether there were any unusual process changes that may be linked to the mercury results for 10/24/12 and 10/30/12, such as issues with either the clarifier or the gravity filters.

Unit 2 was offline for a scheduled outage, and the absorber slurry was drained to the absorber Drain Tank. From 9/30-10/2 and again from 10/19-10/25, some slurry from the absorber drain tank was transferred to Unit 1 absorber. As noted above, we determined that when absorber slurry cools down below normal process temperatures, biological growth increases over time. When purge water was being sent to the FGD WWT during this period, it is likely that a portion of the biological growth was transferred and led to the contamination of the gravity filters and/or chemical reactions caused by the biological growth in the drain tank/absorber increased the concentration of dissolved mercury. This phenomenon with stored absorber slurry appears to be common in the industry, and we have developed and are refining methods to control the impacts associated with this biological growth.

EPA requests that you provide the requested information by May 16, 2014. If you anticipate that will be a problem, please let me know as soon as possible.



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**From:** Jordan, Ronald [mailto:Jordan.Ronald@epa.gov]  
**Sent:** Monday, May 05, 2014 2:06 PM  
**To:** Frank, Stephen  
**Cc:** Jacklin, Mark J; Thomas Finseth; Flanders, Phillip; Schroeder, Cuc; Yan Zhuang  
**Subject:** Effluent data for Keystone Generating Station

Steve,

Thank you for the very productive call on May 1<sup>st</sup>. That helped answer many of the questions we had about the data you have provided for the FGD wastewater treatment system at Keystone Generating Station. To follow up on that conversation and confirm some actions we discussed:

1. EPA requests NRG Energy to provide the available influent and effluent data for samples analyzed using EPA Method 200.8, as mentioned in your February 21 email and discussed on May 1<sup>st</sup>. We understand that such data includes results for arsenic, selenium and other trace metals. In addition, please provide the laboratory reports for these data and confirm whether the laboratory was using a collision cell or dynamic reaction cell as part of the analysis (and if that was so, please confirm which type was used). We do not need you to obtain "J-value" information from the laboratory for these samples.
2. Please provide the laboratory report associated with the 2/21/13 arsenic analysis using Method 6020.
3. Please provide the laboratory report for the 4/10/12 analysis showing 1,390 ug/L arsenic in the FGD influent.
4. Please review process/operational data for July 2012 and August 2013 to evaluate whether there were any unusual process changes that may be linked to the arsenic results for 7/24/12 and 8/12/13.
5. Please review process/operational data (including TSS data) for October 2012 to evaluate whether there were any unusual process changes that may be linked to the mercury results for 10/24/12 and 10/30/12, such as issues with either the clarifier or the gravity filters.

EPA requests that you provide the requested information by May 16, 2014. If you anticipate that will be a problem, please let me know as soon as possible.

Again, thank you for providing the data and your assistance in resolving our questions.

Regards,  
Ron

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